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Virus resistance in transgenic tomato expressing satellite RNA of Cucumber mosaic virus 1 : Genetical aspects and virus resistance

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Summary

The complementary DNA of a symptom suppressor strain of Cucumber mosaic virus (CMV) satellite RNA were transformed into a Japanese cultivar of tomato, 'Shugyoku', to obtain CMV resistant tomato. The resistance of transgenic plants was examined in second generation of self-crossed lines which have satellite cDNA at a single locus in homozygous. A highly resistant line, 'No.4-7' shows only very mild symptom when inoculated with virulent CMV isolates with no satellite RNA. When CMV-Y containing satellite RNA of yellow mosaic type was inoculated, the 'No.4-7' shows symptoms in early phase of infection. However, two or three weeks after inoculation, the transgenic line recovers the growth and shows only mild mosaic symptom. The 'No. 4-7' shows no resistance against CMV with necrogenic satellite RNA. The virulent CMV isolates become attenuated through multiplication in the transgenic tomato. This indicates that the inoculated CMV acquires the satellite RNA in the transgenic tomato. After the acquisition by CMV, the satellite RNA of transgenic tomato is aphid-transmissible to non-transgenic tomato or tobacco with CMV. The transgenic tomato is consideredto produce novel satellite RNA with the samenatures as existing viral RNA in the field. The biosafety assessment of transgenic tomatoline, 'No. 4-7' will be undertaken to develop commercial CMV resistant line.